

ORGANIC PHOSPHATE POISONING OF PEACH PICKERS
IN STANISLAUS AND MERCED COUNTIES, CALIFORNIA
IN SEPTEMBER 1967

HS-263 February 5, 1968

California Department of Food and Agriculture
Division of Pest Management, Environmental
Protection and Worker Safety
Worker Health and Safety Branch
1220 N Street, Sacramento, California 95814

February 5, 1968

Organic Phosphate Poisoning of Peach
Pickers in Stanislaus and Merced Counties, California
in September 1967

California Department of Agriculture
Sacramento, California

SUMMARY

Twenty-three men in Stanislaus County and three men in Merced County developed symptoms of organic phosphate poisoning as well as depression of plasma and red cell cholinesterase values while picking peaches.

The most probable cause of the poisonings was skin exposure to residues of Ethion (up to 25 ppm) and Guthion (up to 74 ppm) that were present on the leaves. It appeared that treated orchards had the potential for human poisoning for as long as five to seven weeks after application of these pesticides.

Memorandum

To : John C. Hillis
Program Supervisor

Date: September 21, 1967

Place: Sacramento

From : Department of Agriculture

- J. E. Shoemaker
Field Supervisor

Subject: Reported Illness in Modesto Area of Peach Pickers

On September 19, 1967, an investigation was made, with L. E. Macomber, Stanislaus County Deputy Agricultural Commissioner and William Tickle, Industrial Safety Engineer, into the reported illness of Mexican peach pickers on the Zambruno, Mayfield and Casazza orchards located in the Hughson area near Modesto

Dr. Paul Klein, Hughson, California, reported to Industrial Safety that after taking blood tests of the fruit pickers he found that they had extremely low cholinesterase. He stated that the first ill pickers appeared in his office on the Labor Day weekend.

We stopped at the home of Tom Mayfield, one of the owners of the orchards, and he showed us a complete spray program for the year. In the orchard, where the pickers became ill, his records indicated it was last sprayed on July 7, 1967, with the following mixture:

Guthion - one-gallon in each tank
Ethion - ten-pounds in each tank
Kelthane- twelve-pounds in each tank

Each tank contained 500 gallons total spray.

Leaf samples were obtained from this orchard (JES 200) to be analyzed in our laboratory for the above chemicals.

The same pickers were working in another orchard on the day of our investigation. The orchard is located on Canal and Waring Roads. Samples of the leaves were obtained (JES 204). This orchard was sprayed on August 4, 1967, at the same rate of application and same chemicals as used in the above reported orchard.

From the information that Mr. Mayfield gave us he indicated that Guthion, Ethion, and Kelthane used in combination was not a common practice by other growers and that this was the first year he had used this combination.

John C. Hillis
Page 2
September 21, 1967

Reported Illness in Modesto Area of Peach Pickers

He feels that the pickers were made ill in his orchard for the following reasons: that most of the pickers have not been employed outside of his operation; the spraying of the trees was done only by himself and his partners, he feels that this combination of sprays may in some way cause the chemicals not to breakdown as readily as indicated on the label for each product.

Dr. Klein stated to us that the pickers are still coming into his office almost every day from the above orchards, some are new patients. He stated that they seem to appear late in the afternoon or toward the end of the week, Thursday or Friday evenings.

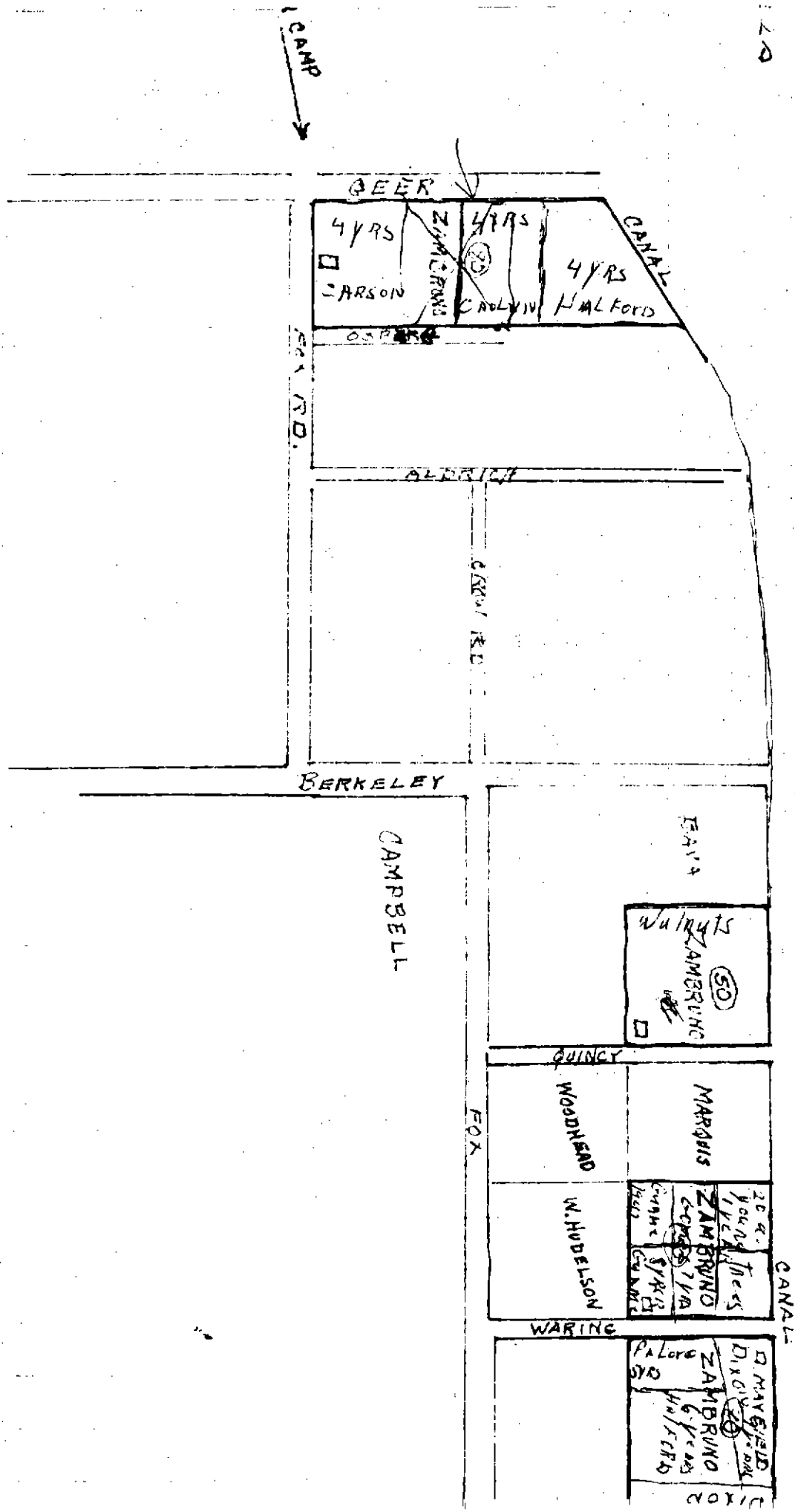
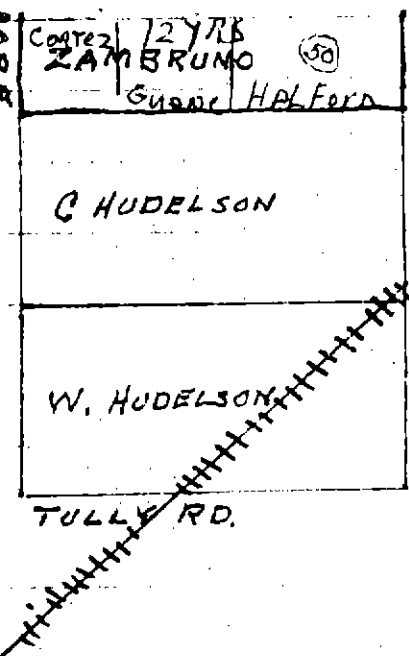
The chemicals used in the orchards were purchased from Central Valley Supply Company, Hughson, which deals mostly with Niagara Chemical Products.

Mr. William Tickle, safety engineer, will obtain a list of the Mexican pickers names who have been treated by Dr. Paul Klein. He stated he will forward this information to me immediately.

It should be pointed out that the owners of the orchards, Mr. Zinbruno and Mr. Mayfield, were very cooperative and it was our opinion that there was no withholding of any information from us during this investigation.

JESje

cc L. Macomber
W. Tickle



Memorandum

To : J. E. SHOEMAKER
FIELD SUPER., AGRIC PEST CONTROL
DEPT. AGRIC

Date : 9-19-67

Subject : ZAMBRUNO,
CASA22R, X MAYRIEL)

HUGHSON

From : Department of Industrial Relations

W. S. Tickle

WE NOTED THE FOLLOWING

- (1) TOTAL men involved 22
- (2) DATE OF FIRST TREATMENT
7 ON 9-2, 7 ON 9-15, 4 ON 9-16,
Now refer to "MAP"
- (3) WORKING IN CAROLINE PEACHES
ON GEER RD. 8-28, 29, 30? 31?
- (4) WORKING IN HALFORD PEACHES
ON GEER RD. 9-14, 15, 16.
[THIS PLAT DIRECTLY NORTH OF CAROLINES
ON GEER RD.]

This suggests something extra unusual
about this area.

CAROLINES sprayed 7-20, EMMON GUTHORP KERTHENS
HALFORDS " 8-4, " " "

PICKERS THIS DATE 9-19 WORKING IN
HALFORDS ALSO SPRAYED 8-4

W. S. Tickle

Memorandum

To :

Date :

Subject :

From : Department of Industrial Relations

P.S. Dr Klein states
he had 1 more New case
& 2-3 a day repeat cases

Should this "MIXING
of pesticides" be referred
back to the suppliers?
or the original mfgs?

Bill

CALIFORNIA DEPARTMENT OF AGRICULTURE
FIELD CROPS AND AGRICULTURAL CHEMICALS

PESTICIDE RESIDUE SAMPLE DATA SHEET

Commodity Peach Leaves

Amount and Container Type _____

Truck or Lot Number and Identification Halford trees - Canal + Waring Rd.

Number of Containers Sampled 1 bag Location Hughson

Grower Zambrano, Mayfield, + Casazza Orchards

Dealer _____

Consumer _____

Remarks Peach pickers became ill after working
in orchard

This orchard was sprayed on 8-4-67

Date Sampled 9/20/67 Inspector's No. 200

Inspector _____

Pesticide Residue Indicated

Amount Found

Guthion

74 ppm

Ethion

25 ppm

Kelthane

200 ppm

Remarks LARGE AMOUNT of Sulfur present

Date Analyzed 9/21/67

Division of Chemistry

cc Stanislaus Co at Ante
Agricultural Comm. (city)

Laboratory No. 45-200

Wm Tickle - Industrial Safety

Chemist N. Morgan

CALIFORNIA DEPARTMENT OF AGRICULTURE
FIELD CROPS AND AGRICULTURAL CHEMICALS

PESTICIDE RESIDUE SAMPLE DATA SHEET

Commodity Peach Leaves

Amount and Container Type 1 bag approx 1/2 lb

Truck or Lot Number and Identification _____

Number of Containers Sampled 1 bag Location Halford Paches - Geert Conel

Grower Zambraa, Mayfield + Sarazza ^{Hughson} Orchards

Dealer _____

Consumer _____

Remarks Peach pickers became ill after working in
orchard.

This orchard sprayed on 7/20/67

Date Sampled 9/19/67 Inspector's No. 201

Inspector _____

Pesticide Residue Indicated

Amount Found

Guthion

10 ppm

Ethion

0.5 ppm

Kelthane

20 ppm

Remarks LARGE AMOUNT OF Sulfur PRESENT

cc Stanislaus Co.
Agri Comm

Date Analyzed 9/21/67

Division of Chemistry

at San Joaquin
(city)

Laboratory No. DS-201

Wm Tickle Industrial Safety

Chemist M. Morgan

DEPARTMENT OF AGRICULTURE
AGRICULTURAL CHEMICALS

PESTICIDE RESIDUE SAMPLE DATA SHEET

Commodity Peaches (Halfords)
Amount and Container Type Orchard
Truck or Lot Number and Identification 500 Geer Road
Number of Containers Sampled _____ Location _____
Grower Sam Bruno Zambreno
Dealer _____
Consumer _____

Remarks _____

Date Sampled 9/26/67 Inspector's No. CLNSR276
Inspector E. L. Miller

Pesticide Residue Indicated

Amount Found

Guthion
Ethion
Kelthane

Trace (within 0.2 ppm)
0.5 ppm
1.0 ppm

Remarks _____

Date Analyzed 9/28/67
at Lark
(city)

Division of Chemistry

Laboratory No. 276

Chemist N. Morgan

511-014 2/65

420 gm / 210 ml
1 ml = 2 mg

CALIFORNIA DEPARTMENT OF AGRICULTURE
FIELD CROPS AND AGRICULTURAL CHEMICALS

PESTICIDE RESIDUE SAMPLE DATA SHEET

Commodity Peaches (Caroline's)

Amount and Container Type Orchard

Truck or Lot Number and Identification _____

Number of Containers Sampled _____ Location Beer

Grower Zambardo

Dealer _____

Consumer _____

Remarks _____

Date Sampled 9/26/67 Inspector's No. QMR277

Inspector C. L. Miller

Pesticide Residue Indicated

Orthion
Ethion
Kelthane

Amount Found

none detected
trace (less than 0.1 ppm)
0.8 ppm

Remarks _____

Date Analyzed 9/28/67

Division of Chemistry

at Laurel
(city)

Laboratory No. 277

Chemist N. J. Morgan

511-014

2/65

430 gm / 215 ml

CALIFORNIA DEPARTMENT OF AGRICULTURE
FIELD CROPS AND AGRICULTURAL CHEMICALS

PESTICIDE RESIDUE SAMPLE DATA SHEET

Commodity Peaches (Hartford's)
Amount and Container Type ORCHARD
Truck or Lot Number and Identification _____
Number of Containers Sampled _____ Location Warring & Canal
Grower Zambirano
Dealer _____
Consumer _____

Remarks _____

Date Sampled 9/26/67 Inspector's No. CLMSR278

Inspector C. L. Miller

Pesticide Residue Indicated

Guthion
Ethion
Kelthane

Amount Found

trace (less than 0.2 ppm)
0.8 ppm
1.5 ppm

Remarks _____

Date Analyzed 9/28/67
at Santa
(city)

Division of Chemistry

Laboratory No. 278

Chemist N. Morgan

834

MERCED COUNTY
DEPARTMENT OF AGRICULTURE

OFFICE: 740 WEST TWENTY SECOND STREET

TELEPHONE 722-7411 - EXT. 204

MERCED, CALIFORNIA



REX LYNDALL

*Agricultural Commissioner
Sealer of Weights and Measures*

JAMES T. REED

Assistant Agricultural Commissioner

JACK A. RAHILLY

Chief Deputy Sealer

October 4, 1967

Van P. Entwistle, Chief
Field Crops & Agricultural Chemicals
Department of Agriculture
1220 N Street, Room #A-268
Sacramento, California 95814

Attention: John C. Hillis
Spray Residue and Agricultural
Pest Control Program

Dear Van:

Milo Schrock, Agricultural Commissioner of Stanislaus County, reported to us the insecticide poisoning of three men that were picking peaches for Frank Cavaiani, who has an orchard in Merced County.

On September 29, 1967, Inspector Tanner contacted Mr. Cavaiani and obtained the following information: On July 8 or 10, Cavaiani applied Guthion, Sulfur, and Kelthane on his peach orchards and repeated with the same combination the first week of August. The men were working in a Halford orchard, and the orchard had been picked on September 6, 7, and 8 for the first time, and no illness was reported. Then on September 14, 15, and 16 the orchard was being picked again; and at this time, three men had reported being sick. Dr. Klein of Hughson treated these men.

The sickness of these men is closely correlated with Mexican Independence Day, which is September 16. Some of his workers reported to him that they had eaten spoiled chicken and became sick. Should these persons have been affected with insecticide poison, it is quite possible, according to Cavaiani, that their exposure would have been from dirty clothing and improper sanitary practices. These men live in the orchards, very seldom do they wash their clothes, and there are no facilities for refrigeration of food.

LOS BANOS OFFICE:

Fourth and "F" Street, Los Banos, California - Telephone 826-5093

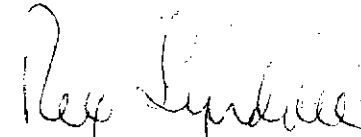
Van P. Entwistle, Chief

-2-

October 4, 1967

While Inspector Tanner conversed with Mr. Cavaiani, an Industrial Safety Representative called and informed him there were an additional 25 sick men--11 on one day--and all reported sick on September 16, 17, and 18 in both Merced and Stanislaus Counties.

Sincerely,



Rex Lyndall
Agricultural Commissioner
Sealer of Weights
and Measures

RL:ijp

cc: Kalstrom
Schrock

Memorandum

To : John C. Hillis
Program Supervisor

Date: October 23, 1967

Place: Sacramento

From : Department of Agriculture

- J. E. Shoemaker
Field Supervisor

Subject: Reported Illness in Modesto Area of Peach Pickers - Second Report

On October 17, 1967, a follow-up was made on the above subject. I interviewed Mr. Tom Mayfield one of the owners of the Zambruno orchard and obtained from him a complete spray program for the 1967 season. Please see attached.

I also further questioned him in regard to the approximate temperatures during the time of harvest and he stated that it was somewhere around 100 degrees or over during almost all of the time the harvest season was on. In regard to the density of the foliage, he felt that it was just a normal amount.

I talked to Mr. William Tickle, Industrial Safety Engineer, and asked if any more pickers had been reported ill during the time between my last report and the time of my return interview. He stated that to his knowledge there had been no additional cases from the Zambruno orchard.

Attachment
JESje

Shoemaker

ZAMBRUNO MAYFIELD CASH 22A
PESTICIDE TREATMENT ZAMBRUNO ORCHARDS -- 1967 (To date)

TREATMENT START	DATE FINISH	ACRES TREATED	VARIETIES TREATED	PESTICIDE	PERCENT ACTIVE	AMOUNT OF MATERIAL PER 100 GAL. WATER	TOTAL GAL. OF WATER OR LBS. OF DUST/ACRE	ACTIVE LBS. PER ACRE
2/24	3/7/67	230	Peaches	W. Copper Dormant Oil Parathion	25%	25 lbs. 3 gallon 2 lb. per 100	400	2
6/13	6/20/67	230	Peaches	W. Sulfur Guthion Kelthane	2# 4#	10 lbs. 1-3/4 pints 1 pint	400	1 1/2 2
7/5	7/10/67	230	Peaches	W. Sulfur Tepp Parathion Trithion	40% 25%	10 lbs. 1/2 pint 2 LB. 1-3/4 pts.	400	1 1/2 pt 2 Lb. 2 Lb.
7/14	7/14/67	18	Palora Cortez	W. Sulfur Kelthane	4 lb.	10 lbs. 1 pint	400	2 lb.
7/20				W. Sulfur Guthion	2#	10 lbs. 1-3/4 pt.	400	1 1/2 #
7/25	7/26/67	40	Carolyn Halford	W. Sulfur Guthion	2#	10 lbs. 1-3/4 pt.	400	1 1/2 #
7/28				W. Sulfur Kelthane	4#	10 lbs. 1 pint	400	2#
8/3/67				Ethion	25%	2#	400	2#

AIRCRAFT APPLICATION

8/13/67	Tepp		4 - 1 gallons used
8/13/67	Tepp		4 - 1 gallons used
8/18/67	Tepp		4 - 1 gallons used
	Tepp	20%	1 - 1 gallon
8/22/67	Niagaramite	80 FC	3 - 5 gallons

Temp at lowest approx 100°

Stan
Wesco

Aircraft application

1 1/2 pbs per acre
TEPP 4%
all applications

8-13-67 Tepp - 4-1 gal used

8-13 Tepp - 4-1 gal used

8-18-67 Tepp 4-1 gal used

Tepp 20% 1-1 gal -

8-22-67 Magnamite 8.0 EC 3-5 gal - TEPP 7 acres

Stan
Wesco

2/24/67 used oil + copper

3 gallons
to 100 gal
water

25 # @ 500 gallon water
B-copper

6/13/ w Sulfur - 10# to 100 H₂O

7/5 w Sulfur 10# to 100 H₂O

7/14 w Sulfur " "

7/20 " " " "

7/25 " " " "

FORM 136B (REV. 3-66)

GENERAL CROP AND ORCHARD INFORMATION

2

TV. Play will

Chase - Dir

Aug / Dix August

Drache
District

3. Dalton

22	23
----	----

Hughson

6.	Flacons
7.	Borns

Sept 3

[illegible]

Temp at harvest approx 100°

Star
Wesco

insect

Aircraft application

1 1/2 pts per acre
TEPP 40
all applications

8-13-67 Tepp 4-1 gal used

8-13 Tepp - 4-1 gal used

8-18-67 Tepp 4-1 gal used
Tepp 20% 1-1 gal -

8-22-67 Megamite 20 EC 3-5 gal - TEPP →
7 acres

2/24/67 used oil & copper
3 gallons
2 100 gal water
25 # @ 500 gallon water
B. Copper

6/13/ w Sulfur - 10# to 100 H₂O

7/5 w Sulfur 10# to 100 H₂O

7/14 w Sulfur " "

7/20 " " " "

7/25 " " " "

Memorandum

To : John C. Hillis

Date: October 30, 1967

Place: Fresno

From : California Department of Agriculture - James J. Kalstrom
Field Crops and Agricultural Chemicals

Subject: Reported Pesticide Poisoning of Peach Pickers
Frank Cavaiani
(Letter Rex Lyndall to Van P. Entwistle, October 4, 1967)

Further information was obtained from Mr. Cavaiani, Lombardi Road, Ballico, on October 17, 1967 regarding the reported pesticide poisoning of three of his workers. Merced County Inspector Mike Tanner accompanied me for this purpose.

Mr. Cavaiani showed us his copies of the Doctor's First Report of Injury for: 1. Jose Perez, 2. Jesus Aguilar, and 3. Daniel Esparza. He also consented to my taking notes from these reports. The following are given in the same order as the men named.

Date of first examination: 1. 9-17-67, 2. 9-18-67, 3. 9-17-67.

Patient's description of symptom:

1. Nausea, headache, eyes hurt like other men in orchard.
2. Sick like other men, has "cold", eyes bother, headache.
3. Nausea, headache, salivation.

Diagnosis:

1. Cholinesterase low normal; organic phosphate poisoning: fairly typical clinically.
2. ? Organic phosphate poisoning?
3. Prob. organic phosphate poisoning; cholinesterase low normal but clinically fairly typical.

Treatment: 1, 2, and 3: Examination, lab, inj.

These men all went to Paul E. Klein, M.D., Hughson.

Mr. Cavaiani stated that none of these men missed any work during this period.

Information was also obtained on the 1967 spray schedule after bloom used by Mr. Cavaiani in the orchards involved. All applications were made at 400 gallons mixed spray per acre.

John C. Hillis
Page 2
October 30, 1967

The quantities of material are given in amounts per 100 gallons of spray:

May 25 -	Sulfur	3 lbs.
	Tedion	1 lb. of 50% wettable powder
	DDT	2 lbs. of 50% wettable powder
	Zinc-Manganese	(amount not obtained)
July 8 or 10 and repeated first week of August -	Guthion	1-1/2 pts. (2 lbs. actual per gallon)
	Kelthane	3 lbs. of 18% wettable powder
Mr. Frank Cavaiani added that these men had also picked in the orchard of his brother, Ugo Cavaiani. His spraying on May 25 was the same as listed for Frank Cavaiani. The later sprays were:		
July 8 or 10 and repeated first week of August -	Guthion	1-1/5 pt. (2 lbs. actual per gallon)
	Ethion	1 lb. 25% wettable powder
	Oil (Par 60)	1 gallon

JJKrp
cc Lyndall

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Place: Fresno

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Field Crops and Agricultural Chemicals

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Kalstrom

Thomas H. Milby, M.D., Chief
Bureau of Occupational Health
Department of Public Health
2151 Berkeley Way
Berkeley, California 94704

January 19, 1968
Sacramento

Illness of Peach Pickers

In September last year our attention was called to two episodes involving illness of peach pickers attributed to pesticides.

One incident involved 23 men employed picking peaches at the Zambruno Ranch near Hughson in Stanislaus County. The workers were given medical attention by Paul E. Klein, M.D., 7201 5th Street, Hughson.

Mr. W. S. Tickle, Safety Engineer, Division of Industrial Safety, who interviewed Dr. Klein, reports that pickers sought medical attention between September 2 and September 23.

Blood samples were obtained from twelve workers by Dr. Klein and submitted to the Purvis Miller Laboratory in Modesto for cholinesterase determination. The cholinesterase levels for plasma and red blood cells are listed on the attached sheet. None of the workers were hospitalized. Dr. Klein is reported to be confident of the diagnosis as organo-phosphorous pesticide poisoning.

Field Supervisor J. E. Shoemaker of this office and Stanislaus County Deputy Commissioner L. E. Macomber interviewed Mr. Thomas Mayfield, a co-owner of the Zambruno Ranch, and obtained the pesticide history for the peach plantings for 1967. This information is attached.

The pesticide program was developed by the ranch and was not the recommendation of any official agency or pesticide industry representative.

Agricultural Commissioner Milo Schrock informs us the pesticide program, while not unique to the Zambruno Ranch, is not a common program for peach growers in Stanislaus County.

Mr. Mayfield commented that the trees of the Carolyn variety have exceptionally heavy foliage and onset of sickness among the workers occurred most frequently while picking this block of trees. He reported the pickers worked regularly for his ranch and had not worked for other employers nor was there any known exposure to pesticides, other than involved in picking.

As you will notice from the attached chart, the entire peach acreage (except for a 30-acre block of one-year-old trees) received three pesticide applications by ground equipment. The next two applications were made only to certain specific varieties. The final ground application was made to an estimated 68 acres wherever needed irregularly throughout the peach orchards.

The Zambruno Ranch contains the following peach plantings:

50 acres	12 year old trees	Cortez, Guam and Halford Varieties
80 acres	4 year old trees	Carson, Carolyn and Halford Varieties
50 acres	7, 8, and 1 year old trees	Gomez and Guam Varieties
80 acres	5, 6, 7, and 8 year old trees	Dixon, Halford and Palora Varieties

We have reviewed labels and associated literature on file in this office for the various pesticides applied and there do not appear to be any directions that warn against the combinations that were used.

We obtained two samples of foliage for analysis. One sample (Inspector's No. JS 200) was obtained on September 20, 1967, from an orchard (Halford Variety) located at Canal and Waring Roads. For this sample our Laboratory reported:

Guthion	74 ppm
Ethion	25 ppm
Kelthane	200 ppm
Large amount of sulfur	

Another sample of foliage (Inspector's No. JS 201) was collected on September 19, 1967, from the same orchard. Our Laboratory reported:

Guthion	
Ethion	0.5 ppm
Kelthane	20 ppm
Large amount of sulfur	

Thomas H. Milby, M.D., Chief
Page 3
January 19, 1968

Three samples of fruit (Inspector's No's. CLM SR 276, CLM SR 277 and CLM SR 278) were collected on September 26, 1967. The Laboratory reported the following:


	<u>Insp. No.</u> <u>CLM SR 276</u>	<u>Insp. No.</u> <u>CLM SR 277</u>	<u>Insp. No.</u> <u>CLM SR 278</u>
Guthion	Trace (Less than 0.2 ppm)	Nil	Trace
Ethion	0.5 ppm	Trace (Less than 0.1 ppm)	0.8 ppm
Kelthane	1.0 ppm	0.8 ppm	1.5 ppm

Determination of the organo-phosphorous residues was made by gas chromatography using a sodium thermionic detector (Varian Aerograph). The Laboratory reports the procedure would detect artifacts or degradation products of organo-phosphorous compounds with the limit of sensitivity depending on the nature of the molecule. Most organic phosphorous substances in excess of one part per million would probably be detected, but many at much lower levels.

The Kelthane residue determinations were made by electron capture gas chromatography.

A separate incident involved illness of three peach pickers employed on the Frank Cavaiani Ranch, Lombardi Road, Ballico, Merced County. These men are reported to have picked peaches (Halford Variety) on September 6, 7, and 8 for the first time, with no illness. Then on September 14, 15, and 16, the orchard was picked again, during which time the three workers became ill and sought medical attention of Dr. Klein at his office in Hughson. Comment has been made that the illness of the men is correlated with Mexican Independence Day, September 16. Some workers on the Cavaiani Ranch (we don't know if this includes any of the three treated by Dr. Klein) are reported to have told Mr. Cavaiani they had eaten spoiled chicken. Attached is a memorandum dated October 30, 1967, from Field Supervisor James Kalstrom listing the pesticide application history on the Cavaiani orchard.

We understand that you or medical officers of your Department have been in contact with Dr. Klein. We will appreciate any comment that you may have on the medical aspects of these two episodes.


John C. Hillis, Program Supervisor
Field Crops and Agricultural Chemicals

Attachments

cc Mr. D. W. Dean
Mr. R. Jackson
Dr. J. E. Swift
Mr. Milo Shrock

**PESTICIDE TREATMENT
ZAMBRINO PEACH ORCHARDS
1967 (to October 17)**

Treatment Date		Equipment	Acres Treated	Pesticide	Amount of	
Start	Finish				Material Per	Amount of Active
					100 Gal. Water	Ingredient Per Acre
2/24	3/7/67	Ground Rig	230	Wettable copper Dormant oil Parathion, 25%	25 lbs. 3 gallons 2 lbs/100	2 lbs.
6/13	6/20/67	Ground Rig	230	Wettable sulfur Guthion (2 lbs/gal) Kelthane (4 lbs/gal)	10 lbs. 1 3/4 pints 1 pint	1 1/2 lbs. 2 lbs.
7/5	7/10/67	Ground Rig	230	Wettable sulfur Tepp, 40% Parathion, 25% Trithion	10 lbs. 1/2 pint 2 lbs. 1 3/4 pints	1 1/2 pints 2 lbs. 2 lbs.
7/14	7/20/67	Ground Rig	18	Wettable sulfur Kelthane (4 lbs/gal) Guthion (2 lbs/gal)	10 lbs. 1 pint 1 3/4 pints	2 lbs. 1 1/2 lbs.
7/25	7/26/67	Ground Rig	40	Wettable sulfur Guthion (2 lbs/gal) Kelthane (4 lbs/gal)	10 lbs. 1 3/4 pints 1 pint	1 1/2 lbs. 2 lbs.
7/28	8/3/67	Ground Rig	68	Trithion, 25% Guthion (2 lbs/gal) Kelthane (4 lbs/gal)	2 lbs. 1 3/4 pints 1 pint	2 lbs. 1 1/2 lbs. 2 lbs.

Above applications at a volume of spray of 400 gallons per acre

AIRCRAFT APPLICATION

Date	Equipment	Acres	Pesticide	Amount
8/13/67	Aircraft	25 (Fox Ranch)	Tepp, 40%	1 1/2 pt/acre
8/19/67	Aircraft	25 (Fox Ranch)	Tepp, 40%	1 1/2 pt/acre
8/22/67	Aircraft	7 (Whitman Ranch)	Tepp, 40%	1 1/2 pt/acre

Kelair *JEH*
UNIVERSITY OF CALIFORNIA
AGRICULTURAL EXTENSION SERVICE

UNIVERSITY HALL
2200 UNIVERSITY AVENUE
BERKELEY 4, CALIFORNIA

February 5, 1968

Mr. John C. Hillis
Program Supervisor
Field Crops and Agricultural Chemicals
California Department of Agriculture
1220 N Street
Sacramento, California 95814

Dear John:

I have received a copy of your memorandum to Dr. Milby concerning illness in peach pickers.

There are two things that strike me as odd. First, again the problem seems to be centered around Hughson, California, and secondly, parathion does not seem to be involved, but ethion and guthion are.

In the first case, why have so many cases, in recent years, appeared in the Hughson region or, at least in Stanislaus and Merced Counties? There are many other peach growing areas in California that have just as high a concentration of peach orchards. Also, presumably most of these other orchards use a pesticide program similar to those used in these two counties. Are more cases reported from this area because of the alertness of Dr. Klein and other physicians in the area, or are the growers in this area doing some little practise that is different from the rest of peach growers in California.

The fact that guthion, ethion, and Kelthane were used in each case where illness occurred suggests several possibilities:

1. There is accumulating a relatively high amount of organophosphorous residues in these treated orchards.
2. There is a synergistic reaction occurring between one or more of the chemicals.
3. Potentiation is occurring because of the mixing of these chemicals.
4. Possibly a chemical change is brought out in one or more of the chemicals because of an antagonistic reaction of two or more of the chemicals and the resultant change may be a more toxic substance.


I don't know if there is any validity in any of these suppositions, but the fact that these illnesses occur and seem to be the result of an organophosphorous poisoning leads to such conjectures. Parathion does not appear to be involved, but two less toxic chemicals are and this poses the questions.

Mr. John C. Hillis
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I think it might be worthwhile to attempt to track this problem down. It will require work and may lead to additional research, but it might be worth it.

I have passed your memorandum on to Blair Bailey and he may be interested in looking further into this.

Sincerely,


John E. Swift, Extension Entomologist
Statewide Coordinator--Pesticides

JES:rch

cc: Thomas H. Milby, M.D.
J. B. Bailey